

# Tips from a distant past

Ten-thousand-year-old stone weapons from the State of São Paulo differ from prehistoric artifacts found in southern Brazil

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WEAPONS FROM  
RIO CLARO

Tapered peduncles,  
exhibiting a V shape,  
measuring up to 1.7  
centimeters long



Projectile arrow or spear tips from Brazil's prehistoric past have mostly been found in the region that runs from the State of Rio Grande do Sul up to the region around the city of Rio Claro, in the State of São Paulo. Regardless of where these tips came from and whether they were made approximately 500 years ago, shortly before the arrival of the European conquerors, or 10,000 years ago, all of the stone weapons found in this vast region are usually classified as belonging to the Umbu tradition, an archaeological culture associated with ancient hunter-gatherers. However, a comparative study of the morphological (physical) characteristics of more than 1,000 tips from the three southern states of Brazil and from São Paulo refutes this classification, which is deemed as being too simplistic, and shows that the weapons from the State of São Paulo differ from those of southern Brazil.

Most of the arrow and spear tips found around Rio Claro, a region full of such artifacts, have a peduncle, which is a shaft or handle on the opposite side of the sharp surface. This peduncle is V-shaped in its contour and is larger and more chiseled than the peduncles of tips found in the south, especially those from the State of Rio Grande do Sul. The weapons from the southern part of the country tend to have a split shape, resembling a fishtail. No spear or arrow tips of this type have been found in São Paulo. "The function of the tips found in the two regions was the same – they were used as weapons for hunting" says archeologist Mercedes Okumura, from the Archeology and Ethnology Museum of the University of São Paulo (MAE-USP), the author of the study. Mercedes was initially supported by a post-doctoral grant from the National Council of Technological and Scientific Development (CNPq), but her research is currently funded by FAPESP. "However, we believe that the shapes of the peduncle can be interpreted as cultural markers, related to distinct groups or tribes."

Because the design of the tips from the south differs from that of the tips from São Paulo, it stands to reason that the inhabitants of the two regions were also different, at least from a cultural point of view. The artifacts of the ancient hunters-gatherers from the states of Rio Grande do Sul, Paraná and Santa Catarina can be classified as examples of the Umbu tradition. The same, however, cannot be said about the weapons from São Paulo, according to the archeologist. They may have belonged to a group with different habits and lithic technology than those of the Umbu tradition, which is dominant in the southern tip of Brazil. "The tips are a complex artifact, containing information about the people who made them," says archeologist Astolfo Araujo, also from MAE-USP, who works with Mercedes. "The construction of tips takes many steps and is a long process of cultural transmission. Learning to make them takes years."

According to Mercedes, the bodies of the tips from the south of Brazil and of those from São Paulo are of similar size. On average, they measure between 2.5 and 3 centimeters. This measure does not take into account the size of the peduncles. The differences between the tips of the two regions appear when we look at the shape and size of the peduncles. In the south, the peduncles tend to measure between 0.9 and 1.1 centimeters. In São Paulo, they are on aver-



age nearly twice the size of those from the south, measuring approximately 1.7 centimeters. In addition, they are never split and are usually tapered. Last year, in addition to studying tips from the Plynio Ayrosa Collection at MAE, Mercedes also visited collections at nine other universities, as well as private collections in southern Brazil and São Paulo.

Mercedes has a degree in biology and extensive experience in analyzing the anatomic features of skulls and bones of prehistoric creatures from Brazil. To conduct her research, she has adapted statistical and quantitative methods already widely used in human evolution studies. “Because there are few ancient human skeletons found in the south and in São Paulo, I decided to study the formal artifacts that these people devised, such as these lithic stones,” Mercedes explains. Equipped with calipers, an instrument used to accurately measure dimensions, she recorded the size of 1,102 tips. She measured 131 weapons from São Paulo, 170 from Paraná, 258 from Santa Catarina and 543 from Rio Grande do Sul. The analyzed artifacts came from ten archaeological sites: five in Rio Grande do Sul (Maquiné, Santo

Antônio, Caí, Ivoti and Taquari), three in Santa Catarina (Taió, Urussanga and Santa Rosa), one in Paraná (Reserva) and one in São Paulo (Rio Claro).

#### FOUR MEASUREMENTS

In her first study of the tips, the results of which have been presented at congresses and will be reported in an article to be submitted to a science journal, the archeologist specifically compared four measurements: the length of the blade, the size of the peduncle, the width of the neck (the region in which the sharp part ends and the handle begins) and the thickness of the arrow at the midpoint of the body. She employed statistical methods and computer programs to compare the measurements and to verify whether the tips could be linked to a single culture – more specifically, the Uumbu tradition – or to more than one method of producing weapons. This strategy is similar to those used by archeologists to quantify the size and shape of

a skull to infer the physical features or ethnic origin of a skeleton, for example, to determine whether a skeleton is of African or Asian origin.

Of the four measurements, only the size of the peduncle exhibited statistically relevant discrepancies. Split handles predominated in six of the nine areas in the south. The artifacts found in Rio Claro – most of which were made of silicite and some of quartz – were different: their tips were tapered. “The artifacts from the area are not all identical, but they are certainly different from the ones from Rio Claro,” says Mercedes. The tips from São Paulo State are classified as being from the Rio Claro phase, which, according to several authors, is akin to a regional accent within the scope of a native language, that is, a local manifestation of the Uumbu tradition. Mercedes and Araujo, however, suspect that the tips from São Paulo are more distinct than this classification implies. They may belong to another stone language with its own tradition, and they may have been cut by a culturally different group rather than the ancient inhabitants of the south. The archeologists from USP believe that it is very unlikely that a single cultural tradition could have been maintained for so long (approximately 10,000 years) in the large region running from the south up to the State of São Paulo (a distance of 1,800 kilometers from the Chui River to Rio Claro). “There might have been two distinct hunter-gatherer populations, one in the south and the other in São Paulo State,” says Araujo. “The inhabitants of São Paulo might have derived culturally from the inhabitants of the south, a region where many of the weapons were found.”

Shelter in the region of Caí, State of Rio Grande do Sul, where most of the tips of the Uumbu tradition have been found



## THE PROJECT

Statistical methods applied to the characterization of Paleo Indian lithic industries: case studies in southeast and southern Brazil

#### MODALITY

Regular Grant for Post-Doctoral Research

#### COORDINATOR

Astolfo Araujo – MAE-USP

#### INVESTMENT

R\$ 153,974.88 (FAPESP)

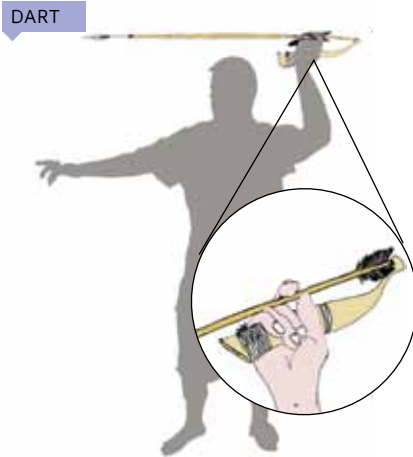
# Spear, dart, or arrow

The lithic tips can be used for three types of hunting weapons

ARROW



DART



SPEAR



The analyses conducted by Mercedes Okumura on more than 1,000 prehistoric lithic tips raise another interesting issue, in addition to the different styles of the artifacts from southern Brazil and from São Paulo. The size of some of the small 10-thousand-year-old weapons from Rio Grande do Sul is compatible with arrow tips. "This was a surprising result," says the archeologist. The oldest lithic arrows found in the United States are much younger than those found in southern

Brazil. They were made between 1,500 and 4,000 years ago. The new data could indicate that the arrow technology in the Americas may have been developed first in the south and later in the north.

The stones are usually divided into three categories, based on their size and weight. The larger and heavier ones were most likely the tips of spears, whose large size made them a valuable weapon a hunter could injure an animal at a short distance. The medium-sized

ones may have been tips of darts that were most likely thrown using an instrument called *atl-atl* launcher. They could not be too large because a larger size would reduce their reach. The smaller and lighter tips were most likely used on arrows. Because they were launched from a wooden bow, they could fly for a longer distance and cause considerable damage. "There is a consensus that the spear tips came first, followed by the dart tips and finally by the arrows," says Mercedes.

In the opinion of archeologist Tom Miller, a retired professor of the Federal University of Rio Grande do Norte (UFRN) who studied stone tips from São Paulo State in the 1970s, the hypothesis that the Rio Claro weapons belong to a different culture rather than the one in the south makes sense. "The attempt to classify the material from Rio Claro as being Umbu has been a mistake right from the start," says Miller. "The different shapes of the peduncle could represent a difference in terms of style or attachment of the handle to the artifact." However, he also feels that cultural traditions cannot be defined solely by a study of one type of artifact, such as the tips from a specific region. They also have to be based on more complex analyses that take into account the technology and adaptation strategies of the ancient inhabitants of a given region.

Argentina's Marcelo Cardillo, an archeologist from the University of Buenos Aires who conducts similar studies on stone weapons from Patagonia and the Puma region, follows a line of reasoning that does not differ much from Miller's thinking. Although he acknowledges that he is not a specialist in Brazilian archaeology, he argues that the statistical analysis of the measurements of the tips from the south and from São Paulo State provides a basis for Mercedes's conclusions. "It is quite possible that the style or the design of the weapons might have varied in the course of time and space," says Cardillo, a critic of the tradition concept. "This might have occurred for very different reasons, related, for example, to environmental factors or random processes, such as a cultural trend, or to the availability of different materials in a place or at a time."

Objects cut by human hands – known as material culture – provide information about the people who made them, especially when they are the single or most important archeological finding associated with a population or a society that has disappeared. This situation is not found only in southern Brazil and São Paulo. In the United States, the famous Clovis culture, believed to have appeared approximately 13,000 years ago and for many years considered the most ancient culture of the Americas (a hypothesis that is now being challenged), is primarily known because of the stone tips retrieved at sites in New Mexico. Human skeletons associated with the Clovis culture have never been found. This does not mean that the importance of this ancient culture, with its long tips that sometimes resemble an upside-down champagne glass, is no longer acknowledged. ■